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posals of the visitors for three nights, during the first two of which excellent views were had of nebulae, star clusters and planets at the 100-foot focus. On the third night the focal plane spectrograph was exhibited in operation at the 25-foot focus of the instrument.

The Snow telescope, the 60-foot tower telescope and the 150-foot tower telescope were observed in operation on the sun, as was also the equipment of the Astrophysical Station of the Smithsonian Institution.

The committee on magnitudes for the Carte du Ciel and the committee on selected areas took advantage of the presence of their respective members to hold meetings. The first-named body agreed on the following:

1. That the photographic magnitudes shall be perfectly independent of the visual ones.
2. The two scales, however, shall coincide for the stars of spectral type A₀ of magnitude 5.5 to 6.5, Harvard system.

The several methods used at Harvard for obtaining fundamental magnitudes were explained and discussed. Further work on such fundamental photographic magnitudes is contemplated by the observatories of Harvard, Potsdam, Mount Wilson, Simeis and Johannesburg.

The committee on selected areas noted the progress of their work along the following lines: (1) Durchmusterung plates, (2) parallaxes, (3) proper motions, (4) additional proper motion plates for the parallels of -45° and $+45^\circ$, (5) visual and photographic standards of magnitude, (6) estimates of visual magnitudes, (7) the photographic magnitudes, (8) photographic magnitudes of the Cape Photographic Durchmusterung, (9) classification of spectra, (10) red sensitive plates, (11) radial velocities, (12) sun's motion through space, (13) brightness of the background of the sky, (14) selective absorption of light in space.

On Saturday, September 3, the descent from the mountain was made. That evening the members of the conference were entertained at dinner at the Maryland by Mr. and Mrs. Hale.

H. D. BABCOCK

*SESSIONS OF THE INTERNATIONAL COMMISSIONS FOR TERRESTRIAL MAGNETISM, ATMOSPHERIC ELECTRICITY AND METEOROLOGY*¹

THE Commission for Terrestrial Magnetism and Atmospheric Electricity met in Berlin, at the Royal Meteorological Institute, Professor Dr. G. Hellmann, director, on September 23, with about twenty members present, M. Rykatschew, president, and Ad. Smidt, secretary. The first business was the reading of a report of progress on the work laid down by the commission at Innsbruck three years ago. Prominent place was given in further reports to the intercomparison of standard magnetic instruments, by Dubinsky, Schmidt and Chree, including the observatories at Pavlovsk, Karsani, Katharinenburg, Irkutsk, Upsala, Rude Scov, Kew, Potsdam and Cheltenham. The European observatories, especially in Russia, agree closely together, while an unexpectedly large discrepancy was reported for Cheltenham, which was accompanied by an explanation. With the view of enlarging the network of observatories it was intimated that steps were being taken to found one or two new permanent magnetic stations in Norway, and one in Italy or Tunis. The establishment of the magnetic observatory at Pilar, Argentina, in connection with solar physics and ionization researches, was reported. This station is a few miles south of Cordoba, and it is proposed to make it an important institution for the work of the southern hemisphere. Professor Bigelow, recently of the U. S. Weather Bureau, has been appointed to this duty, and Dr. W. G. Davis, director of the Meteorological Office, expects to develop the equipment as rapidly as is practicable. Arrangements were discussed at Berlin to facilitate the exchange of magnetic curves on days of large disturbances. The best methods of publishing the routine magnetic data, in order to meet the demands of students interested in solar physics and atmospheric ionization, were considered, but as the subject is complex it was referred to a special committee, v. Everdingen, Chree, Schmidt, for further

¹ Berlin, September 23-29, 1910.

examination and report. The progress made by the Department of Terrestrial Magnetism of the Carnegie Institution, as shown by a special report, in securing magnetic observations in all parts of the earth, especially on the ocean areas, was very favorably commended by a special resolution, expressing the gratification of the commission in respect of this efficient service. There is a disposition to form as close a cooperative association as practicable for the development of the research into the laws of the distribution and secular variation of the earth's magnetic field. From personal discussion it seems evident that the opinion is growing that the diurnal, annual and secular variations are due to the moving charges of free electricity in the atmosphere, carried by the general and local circulations, while the spasmodic large disturbances depend upon the bombardment of ionic corpuscles from the sun, and the slow oscillations of two or three days' duration upon the movement of ions through the gaseous upper layers of the atmosphere, generally along the magnetic meridians.

On September 25 a visit was paid to the observatories at Potsdam and Seddin. The meteorological, magnetic, astrophysical and geodetic departments at Potsdam were carefully inspected, and the officials in charge gave every facility for examining the apparatus. A most comprehensive and thoroughly scientific policy prevails at Potsdam, as is well known, and this, together with the beautiful surroundings, made a most agreeable impression upon the commission. Seddin is a new magnetic observatory about ten miles southwest of Potsdam, and, being located in the state forest area, will have protection from intrusion in the future. The advance of electric currents towards the Potsdam site has been met by the Seddin observatory for the variation observations, while the absolute measures are still carried on at Potsdam, together with such other magnetic work as is found practical and convenient.

The International Meteorological Committee met on September 26 in the same place, about fifteen members being present. Professor Bigelow was invited to a seat with the

committee. Dr. W. N. Shaw was the president and Dr. G. Hellmann the secretary. Reports to the number of twenty were laid before the committee for discussion, and some of the important decisions will be mentioned. It is proposed to issue an official list of addresses of individuals and institutions which will facilitate the exchange of scientific publications. Steps are being taken to minimize the discordant methods now prevailing in the publishing of the mean values of meteorological data by the different services. The proposition to extend synoptic charts to the equator was referred to the Deutsche Seewarte for action. An account was given of efforts made to secure prompt daily telegraph service from Spain and Portugal, which project has the favorable assistance of those governments. The proposition from M. Köppen to adopt a new absolute system of the units of measure, including a specially defined barometer column as the unit of length with 1,000 subdivisions, was not found practicable at present. To meet the requirements of the Solar Commission and of the Commission of the Mondial System, it was agreed that the réseau of stations already selected by the commissions should be substantially adopted, and that the directors of the several services throughout the world should forward promptly to Dr. W. N. Shaw, London, the monthly means of the prescribed data for publication by the Solar Commission within the current year. These data are at present to be limited to pressure, temperature, wind direction and velocity at about 150 stations distributed so that there shall be one for each square of ten degrees of the earth's surface. It may become practicable to considerably increase the number of stations. This international scheme differs from that of the U. S. Signal Service in the seventies, in that the data are limited to accurately reduced monthly mean values, which are to be used in connection with the problems in solar physics. The committee approved the plan of securing accurate data for new isothermal charts of the world, but did not think it proper to prescribe the rules of reduction, or the special years to be selected for the group from which normals are constructed, on account of the diversity

of local conditions, but urged that each report should fully explain the methods of reduction actually practised. Two changes were made in the European telegraphic daily code messages: (1) three spaces now used by the wet bulb readings were dropped; (2) their places were supplied by figures representing the barometric tendency, that is, the change in the barometric pressure in a three-hour interval. Further arrangements were made for a wireless service in the important mid-Atlantic region represented by the Azores, so that there shall be a transmission of messages from Porta del Garda and Flores through Horta, to Europe, the United States and Canada. Similarly, the service will be improved from Iceland, Greenland and the Hudson Bay and Straits districts. These North Atlantic data are found valuable in making the weather forecasts. Thanks were expressed to the Portuguese government, Chaves, Ryder and Stupart for these prospective improvements. It has not been found that ordinary wireless messages from vessels at sea are yet sufficiently developed and controlled to give the necessary long distance and regularity required for improving the forecast systems, but further experiments are approved, especially in attaching remote stations to regular line offices. A special report was made on the unusual and unnecessary diversity of maritime storm warning signals, now prevailing all over the world to the great confusion of navigators, and after much discussion it was agreed to adopt the cone and drum signals for *day* use, as proposed at the London meeting of 1909, but that the subject of lights for *night* signals be referred to the same committee for further investigation. Hergesell made an extended report on behalf of the Commission on Aeronautics for the exploration of the upper air by means of balloons and kites, showing a great extension of permanent observatories in the United States, Canada, Argentina, in several countries of Europe, India, Australia, Africa and many temporary explorations, the most important being in the tropics and in the Arctic regions. In the tropics the isothermal layer usually begins at 16,000 meters elevation, and in the polar zone

at about 10,000 meters. Below this layer there is turbulent circulation of the atmosphere, with mixing convection currents, while the isothermal layer itself seems to be the region of solar insolation without convection of importance. A proposition to explore the radiation effects in the isothermal layer by means of spectrograms was favored in principle, but no action was taken. Similarly, polarization observations were encouraged without special official instructions. The commission on radiation was reorganized and among the members Bigelow represents Argentina and Kimball the United States. The standardization of pyrheliometers was strongly urged, but it was thought too early to designate a central office for that purpose. It was hoped that the experiments now in progress would be sufficiently advanced before another meeting of the international committee to permit it to take more specific action at that time. No action was taken regarding the definition of gradient signs, as this involved the fixing of the fundamental system of the axes of coordinates of reference, which was too large a subject for immediate consideration. The topics of snowfall, water equivalent, evaporation apparatus and the status of these problems in meteorology were discussed without arriving at any definite resolutions. The next meeting of the international committee will take place at Paris, 1913. An interesting excursion was made to the important aeronautical station at Lindenburg on September 30; Professor Dr. G. Hergesell most courteously entertained the committee at dinner on September 28.

I have been very much impressed at the Berlin meeting by the notable advances in scientific meteorology, especially by the efforts to study the circulation of the atmosphere, together with the radiation and solar physics problems, as represented by numerous commissions. In addition to improving the usual forecast and storm warning services, and the climatological data, systematic plans are now fully in operation to develop the hydrodynamics and thermodynamics of the atmospheres of the earth and of the sun, in connection with the phenomena of solar radiation

and its very numerous effects in the atmosphere of the earth. The expense of the necessary instruments and the theoretical complexity of the problems will limit these special researches to a comparatively few students, but every encouragement is extended to those who are able to work along these lines.

FRANK H. BIGELOW

BERLIN,

September 30, 1910

LECTURES ON PUBLIC HEALTH

A COURSE of lectures on public health problems and the prevention of disease will be given at Teachers College, Columbia University, on Mondays at 5 P.M. throughout the year. The lectures, which are open to the public, are to be given during the first half year as follows:

October 10—"The Development of Public Health Work," Dr. Hermann M. Biggs, Medical Officer of the Department of Health of the City of New York.

October 17—"Water Pollution and Water Purification," Dr. C. E. A. Winslow, Associate Professor of Biology, College of the City of New York; Curator of Public Health, American Museum of Natural History.

October 24—"Clean Streets as a Factor in Public Health" (to be announced later).

October 31—"The Collection and Disposal of Municipal Waste," George A. Soper, Ph.D., Metropolitan Sewerage Commission.

November 7—"Communicable Diseases, Diphtheria, Typhoid Fever, Scarlet Fever, etc.—Their Transmission," Dr. William Hallock Park, Director, Research Laboratories, New York City Health Department.

November 14—"Communicable Diseases—Their Prevention," Dr. William Hallock Park.

November 21—"Some Examples of the Control of Infectious Diseases," Dr. Simon Flexner, Director of the Rockefeller Institute.

November 28—"The City Milk Supply and its Control," Dr. Ernst Lederle, President and Commissioner, New York City Health Department.

December 5—"Flies and other Insects as Carriers of Disease" (to be announced later).

December 12—"Housing and Health," Mr. Lawrence Veiller, Secretary, National Housing Association.

December 19—"Tuberculosis: The General

Problem; The Organized Campaign against the Disease," Dr. Livingston Farrand, Executive Secretary, National Association for the Study and Prevention of Tuberculosis.

January 9—"Tuberculosis as a Social Problem. Methods of Treatment," Dr. James Alexander Miller, Associate Professor, Clinical Medicine, College of Physicians and Surgeons.

January 16—"What the Teacher should know of the Tuberculosis Problem," Dr. S. Adolphus Knopf, Associate Director of Clinic of Pulmonary Diseases, Department of Health.

January 23—"What the Teacher could do toward the Solution of the Tuberculosis Problem," Dr. S. Adolphus Knopf.

LOWELL LECTURES

EIGHT courses of Lowell lectures are announced for the present season, of which five are in the sciences. These are as follows:

Eight lectures by Franz Boas, LL.D., professor of anthropology in Columbia University, on "Cultural Development and Race." (1) "Human Faculty and Race," (2, 3) "Hereditary Stability and Adaptation in Human Types," (4) "Human Faculty as a Result of Cultural Development," (5) "Relations between Type, Language and Culture," (6) "Unconscious and Rational Elements in the Mental Development of Mankind," (7) "Can the History of Civilization be considered as a Single Evolutionary Series?" (8) "Types of Thought in Primitive and in Advanced Society." On Wednesdays and Fridays at 8 P.M., beginning Wednesday, October 19.

Eight lectures by Edward Bradford Titchener, LL.D., Sage professor of psychology in the Graduate School of Cornell University, on "The Structure of Mind." (1) "The Problem," (2) "The Method," (3) "Sensation," (4) "Attention," (5) "Perception; the Problem of Meaning," (6) "Conscious Attitude," (7) "Memory and Imagination," (8) "Patterns of Consciousness." On Tuesdays and Thursdays at 5 P.M., beginning Tuesday, November 1.

Eight lectures by William Ernest Castle, professor of zoology in Harvard University, on "Heredity in Relation to Evolution and Animal Breeding." (1) "Biological Discov-